

CLAIMS

1. Print robot for large format three-dimensional printing on a fixed surface (11), comprising an inkjet printing assembly (13), means for displacing and orientating this printing assembly along several axes, at least one control unit controlling these means and a drying device for the ink sprayed onto said surface (11), characterized in that said robot (10) is a print robot with five motorized axes and in that the displacement and orientation means comprise:

- a carrier (15) with three degrees of freedom in translation, which ensures positioning of the printing assembly (13) allowing its horizontal (Tx), vertical (Ty) and depth (Tz) translation,

- a wrist (16) with two degrees of freedom in rotation which supports and ensures the orientation of the printing assembly (13) allowing its rotations (Rx, Ry) along two perpendicular axes.

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2. Robot as in claim 1, wherein the carrier (15) comprises:

- a first mobile carriage (21) provided with a driving system moving on two horizontal rails (22),

- a beam (26) fixed perpendicular to the first mobile carriage (21), a second mobile carriage (28) provided with a driving system moving on two vertical rails (27) mounted on this beam (26),

- a slide (30) fixed perpendicular to the second mobile carriage (28), a mobile platform (31) moving along this slide (30).

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3. Robot as in either of the two preceding claims, wherein the wrist (16) comprises two identical systems (40, 40') screws (41, 41')/rods (42, 42')/cranks (43, 43') each linked to a mobile carriage (44, 44').

4. Robot as in claim 3, wherein the wrist (16) supports the ink drying device.

5. Robot as in claim 4, comprising five servomotors respectively associated with the five axes of this robot.

6. Robot as in claim 5, which as input comprises:

- several optical sensors to measure the distance between the printing assembly (13) and the surface to be printed (11),
- five encoders for the motor axes to determine the displacement of the servomotors,
- two end-of-travel sensors and one start point sensor respectively associated with each axis of the robot.

7. Robot as in claim 6 comprising a real-time control device which comprises:

- a central unit module,
- at least one module to control the axes,
- a digital input-output module.

8. Robot as in claim 7 comprising a general control device which includes:

- a real-time control module (82),
- a sensor signal interfacing/relay and packaging module (83),
- a supply/instrumentation module (84),
- 5 - a brake feed module (85),
- a safety management module (86),
- a ventilation assembly (87),
- five digital motor speed controllers (88).

10 **9.** Robot as in claim 8 comprising:

- a first computer terminal dedicated to control of the movements of this robot,
- a second computer terminal dedicated to monitoring the robot, including:

- 15 • coordination between displacement of the robot and the printing operation,
- processing the digital image to be printed,
 - man-machine interfacing.

20 **10.** Robot as in claim 1, wherein the printing assembly comprises at least one printing block (18) provided with several printing heads (14) using inks of different colours.

25 **11.** Robot as in claim 10, wherein each printing block comprises four printheads respectively using yellow, cyan, magenta and black inks.

30 **12.** Robot as in claim 10, wherein the inks are ultraviolet drying inks.

13. Printing process using at least one robot as in any of the preceding claims, which after a prior step to digitize the image and divide it into strips of determined width, comprises the following steps:

- 5. - positioning a medium with respect to the robot(s);
- initial setting of the robot(s) and positioning their heads with respect to the surface of the medium, at the point where printing of the image is to start,
- 10 - printing the image on said surface with successive printing of the different vertical strips forming the image,
- return to a rest configuration.

15 14. Process as in claim 13, which comprises a prior surface preparation step so as to make it clean and uniformly white.

20 15. Process as in claim 13, wherein printing starts at the lower left-hand corner of the surface.

 16. Process as in claim 13, wherein the width of the vertical strips is approximately 7 cm.